

Researchers find functional change in brains of patients with type 1 diabetes

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The study of the University of Barcelona shows an important step forward in the understanding of how this disease can affect the brain during the cognitive activity. Credit: Universidad de Barcelona



Researchers from the Institute of Neuroscience and the Institute of Complex Systems (UBICS) of the University of Barcelona have identified differences in the pattern of the neurofunctional activation in patients with type 1 diabetes. The study, conducted with neuroimaging techniques, represents an important step towards the understanding of how T1D can affect the brain during the cognitive activity and could have implications in the treatment for people who suffer from this metabolic disease.

T1D is a chronic disease caused by a lack of insulin, a hormone that controls the sugar in blood. This type of diabetes forces patients to take insulin daily and it is a cause of blindness, renal impairment and myocardial infarct, among other complications.

Changes in brain activity

The new study explored using <u>functional magnetic resonance</u> imaging techniques (fMRi) to examine the neuronal activation pattern in 22 patients with type 1 diabetes and a control group of 16 healthy people while they conducted memory tasks with verbal and visual stimuli. This technique measures the <u>brain activity</u> during activities with which the changes in blood flow occur in the brain depending on the areas with a higher energy use.

"The behavioural response to the tasks in the experiment was almost the same in both groups, but brain activity was different and T1D patients showed a lower cortical activation than those in controlled groups," says Joan Guàrdia.

Adaptation to balance cognitive dysfunction

These results support the idea that T1D has an impact on brain activity



and and shows that in some circumstances, the brains of these patients adapt to prevent cognitive impairments.

"Activations in the observed right inferior frontal area, the cerebellum and the putamen in T1D patients can be an adaptive response to reach the same behavior performance level than those in healthy patients," says Joan Guàrdia.

According to the researchers, these changes in the brain activation pattern could be neuroplastic adaptations to the glucose deregulation caused by the lack of insulin.

"If these results are confirmed, it is important to design maintenance programs on maintenance of <u>cognitive activity</u> for people with this disease, an approach which is not very common at the moment," concludes the researcher.

More information: Joan Guàrdia-Olmos et al. Effect of verbal task complexity in a working memory paradigm in patients with type 1 diabetes. A fMRI study, *PLOS ONE* (2017). DOI: 10.1371/journal.pone.0178172

Provided by University of Barcelona

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